

CLAIM AMENDMENTS

The present listing of claims is as follows:

1. (Previously presented) An apparatus for reducing contaminants in a fluid stream, the apparatus comprising at least one light source for producing radiant energy to produce radicals in the fluid stream, whereby the light source is a dielectric barrier excimer discharge lamp driven with a pulse having an excitation pulse duration between 1,000 and 0.100 microseconds alternating with an idle period between 10,000 and 1 microseconds.
2. (Original) The apparatus according to claim 1 comprises at least one heterogeneous and/or homogeneous catalyst having an upstream end and a downstream end, and at least one surface having a plurality of catalytically active sites on the surface the catalyst positioned such that at least a portion of the fluid stream contacts at least a portion of the catalytically active sites on the surface.
3. (Original) The apparatus according to claim 1, whereby the dielectric barrier excimer discharge lamp comprises a filling gas comprising a noble gas selected from the group of Argon, Krypton and/or Xenon, whereby Xenon is preferred.
4. (Original) The apparatus according to claim 1, whereby the dielectric barrier excimer discharge lamp has filling gas pressure of 50 mbar to 600 mbar.
5. (Original) The apparatus according to claim 1, whereby the dielectric barrier excimer discharge lamp comprises: - 0 weight.-% to 100 weight.-% Argon; and/or - 0 weight.-% to 100 weight.-% Krypton; and/or - 0 weight.-% to 100 weight.-% Xenon; based on the total weight of filling gas in the dielectric barrier excimer discharge lamp.

6. (Original) The apparatus according to claim 1, whereby the dielectric barrier excimer discharge lamp comprises a phosphor material, whereby the phosphor material is preferably selected from the group of $\text{YPO}_4\text{:Nd}$, $\text{YPO}_4\text{:Bi}$, $\text{YPO}_4\text{:Pr}$, $\text{LuPO}_4\text{:Pr}$ and/or $\text{LaPO}_4\text{:Pr}$, more preferably a mixture thereof.

7. (Original) The apparatus according to claim 1, whereby the dielectric barrier excimer discharge lamp has the maximum emission intensity at a wavelength of between: - 150 nm and 200 nm, preferably 160 nm and 190 nm, more preferably 170 nm and 180 nm; or - 160 nm and 230 nm, preferably 170 nm and 210 nm, more preferably 175 nm and 190 nm; or - 220 nm and 250 nm, preferably 225 nm and 249 nm, more preferably 230 nm and 248 nm.

8. (Cancelled)

9. (Original) The apparatus according to claim 1, having a combustion chamber with a precombustion gas stream to the combustion chamber and a postcombustion gas stream of exhaust from the combustion chamber, wherein at least one dielectric barrier excimer discharge lamp is positioned in the precombustion gas stream.

10. (Original) Use of an apparatus according to claim 1 for treating fluid stream to reduce the concentration of at least one pollutant of a fluid, preferably for treating an exhaust gas stream from the combustion of a fuel in an engine to reduce the concentration of at least one pollutant of said gas stream, more preferably reduce the concentration of at least one pollutant of the fluid of an fuel cell.

11. (Previously presented) The apparatus according to claim 1, wherein the excitation pulse duration is less than or equal to 1 microsecond and the idle period is about 100 microseconds.

12. (Previously presented) An apparatus for reducing contaminants in a fluid stream, the apparatus comprising:

a plurality of light sources for producing radiant energy to produce radicals in the fluid stream, whereby each of the plurality of light sources is a dielectric barrier excimer discharge lamp; and

a sensor of pollutant load present in the fluid stream operably connected to the plurality of light sources;

wherein the sensor activates a number of the plurality of light sources dependent on the pollutant load present in the fluid stream.

13. (Previously presented) The apparatus according to claim 12 wherein the sensor is further operable to control fluid stream rate.

14. (Previously presented) The apparatus according to claim 12 wherein the sensor is further operable to control pollutant load in the fluid stream.

15. (Previously presented) The apparatus according to claim 12 wherein the sensor is further operable to control dielectric barrier excimer discharge lamp function.

16. (Previously presented) The apparatus according to claim 12 wherein the plurality of light sources is pulsed operated.

17. (Previously presented) An apparatus for reducing contaminants in a gas stream, the apparatus comprising at least one light source for producing radiant energy to produce radicals in the gas stream, whereby the light source is a dielectric barrier excimer discharge lamp driven with a pulse having an excitation pulse duration less than or equal to 1 microsecond alternating with an idle period of about 100 microseconds, wherein the dielectric barrier excimer discharge lamp has the maximum emission intensity at a range selected from the group consisting of 170 nm and 180 nm, 175 nm and 190 nm, and 230 nm and 248 nm.

18. (Previously presented) The apparatus according to claim 17 wherein the dielectric barrier excimer discharge lamp comprises a phosphor material selected from the group consisting of $\text{YPO}_4\text{:Nd}$, $\text{YPO}_4\text{:Bi}$, $\text{YPO}_4\text{:Pr}$, $\text{LuPO}_4\text{:Pr}$, $\text{LaPO}_4\text{:Pr}$, and mixtures thereof.

19. (Previously presented) The apparatus according to claim 17 wherein the at least one light source comprises a plurality of light sources for producing radiant energy to produce radicals in the gas stream, whereby each of the plurality of light sources is a dielectric barrier excimer discharge lamp, the apparatus further comprising:

a sensor of pollutant load present in the gas stream operably connected to the plurality of light sources;

wherein the sensor activates a number of the plurality of light sources dependent on the pollutant load present in the gas stream.

20. (Previously presented) The apparatus according to claim 17 further comprising a sensor of pollutant load present in the gas stream operably connected to the at least one light source, wherein the sensor is operable to control a parameter selected from the group consisting of control gas stream rate, pollutant load in the gas stream, and dielectric barrier excimer discharge lamp function.

21. (Previously presented) The apparatus according to claim 17 wherein the gas stream is selected from the group consisting of an exhaust gas stream from the combustion of a fuel in an engine and fluid of a fuel cell.